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(19)

(54) WELDING MASK FILTER AND FILTER SYSTEM

(71) I, DENNIS ALBERT GEORGE MARSHALL, a British Subject, of "Greets Cottage", Friday Street, Warnham, Near Horsham, Sussex, do hereby declare the invention

for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an air filter for use in a vacuum line connected to a welding mask. It also relates to a welding mask filter system.

According to the invention, an air filter for use in a vacuum line connected to a welding mask comprises a casing having an inlet and an outlet, and a pair of concentrically-arranged cylindrical air-filtering elements disposed within the casing and arranged in series, the inner filtering element through which the air passes first being formed of a pair of cylindrical air-permeable metal screens between which is sandwiched a woven glass-fibre fabric as a washable filtering medium, and the outer filtering element through which the air passes second having air-permeable paper as a filtering medium.

The invention also extends to a welding mask filter system comprising a vacuum source connected by a pipe or other conduit to the delivery side of a filter as described above, the air-entry side of the filter being connected by a flexible pipe to the welding mask.

An example of a filter and filter system in accordance with the invention is shown in the accompanying drawing, in which:

Figure 1 is a diagramatic view of the filter system with certain parts shown in section; and

Figure 2 illustrates a modification to the system shown in Figure 1.

The filter system shown in Figure 1 comprises a welding mask 10 having a window or eye-piece 12 as is customary in such welding masks. In the lower portion of the welding mask there is an opening 14 for the entrance of air into a metal pipe 16 which forms part of the mask. The pipe 16 is connected to a flexible pipe 18 which leads, in turn, to a two-stage interceptor or air filter 20 which is shown on a larger scale than the remainder of the filter system so that its construction can be seen more easily. The filter or interceptor 20 has a casing 22 of cylindrical form within which are disposed, in series, two concentrically-arranged, cylindrical air-filtering elements 24 and 26. The air-filtering element 24 through which the air passes first is formed of a pair of cylindrical air-permeable metal screens 28 and 30 between which is sandwiched a woven glass-fibre fabric 32 as a washable filtering medium. The screens 28 and 30 can be formed of an "open-weave" metal mesh or, alternatively, of perforated metal plates having a large number of small holes over their entire surface. The woven glass-fibre fabric 32 can be in pleated form, but this is not essential for operation of the filter.

The outer filtering element 26 has air-permeable paper as a filtering medium. As with the filtering element 24, the paper of the filtering element 26 can be pleated if desired.

The upper end of the filter casing 22 is sealed by a removable cover 34 which is held in position by fasteners 36 of which only one is shown in the drawing) permitting ready removal of the cover so that the filtering elements can be cleaned or replaced as and when that becomes necessary. The lower ends of the filtering elements 24 and 26 rest on a circular dividing wall 38 and are sealed against that wall by sealing rings 40 and 42. Similarly, the upper ends of the two filtering elements are sealed against the inner surface of the cover 34 by means of sealing rings 44 and 46.

The inlet into the filter 20 from the flexible pipe 18 is formed by an upper opening 48 in the cover 34 of the filter casing. The outlet for filtered air from the filter is formed by an opening 50 in the lower portion of the cylindrical wall of the filter casing. The filter casing has a bottom wall 52 which has a central opening 54 connected by a passage 56 to a dust-collecting bag or other receptacle 58. To control the operation of the filter, a valve 60 is provided in the passage 56, and a valve 62 is provided in the flexible pipe 18.

The outlet 50 from the filter is connected

by a pipe or other conduit 64 to a vacuum source 66. The vacuum source can be of conventional construction, and will generally comprise an electric motor driving a suction fan. Such units are readily available on the market. The air-exhaust side 68 of the vacuum source 66 leads into two further filters 70 and 72. The filtering material in these two filters 70 and 72 can be of many different kinds—for example, air-filtering paper, air-permeable foam material or glass fibre material.

In a modification of the system described above, the air-exhaust side of the vacuum source 66 can be connected to an air filter incorporating activated carbon for the removal of ozone from the air drawn into the vacuum source. Such a modification is shown in Figure 2 where the air-exhaust side 68 of the vacuum source leads into an activated carbon filter 74. This filter can be composed of a multiplicity of cells containing activated carbon granules, the granules being sealed in their cells by perforated plates or wire mesh screens. The outlet 76 of the activated carbon filter then leads into one or more final filters corresponding to the filters 70 and 72 shown in Figure 1.

In operation of the filter system shown in Figure 1, the vacuum source is switched on during use of the welding mask 10 so as to draw air through the opening 14 in the mask and thence through the pipe 16, the flexible pipe 18, the filter 20, the pipe 64, and, finally, out into the atmosphere through the pipe 68 and the final filters. The filter 20 has been found in practice to be very effective in removing noxious gases, fumes and particles from the air flowing through the pipe 16 and flexible pipe 18. Moreover, not only does the filter act to remove such solid particles and noxious fumes or gases, but it also serves as a spark arrester.

As will be appreciated, during operation of the filter system the valve 62 on the inlet side of the filter 20 will be open, as well a valve 78 on the exit side of the filter 20. The valve 60 in the passage 56 leading to the dust-collecting bag or other receptacle 58 will normally be closed. When however it is desired to clean the filter 20, the valve 60 can be opened and a high pressure air-line connected to the filter casing 22 so as to dislodge dust particles which have collected on the filtering elements 24 and 26. The particles thus dislodged by the air under high pressure will then enter the dust-collecting bag or other receptacle 58 through the passage 56. At extended intervals of time, it will be desirable to remove the filtering elements 24 and 26 from the casing 22 so as to clean them more thoroughly, the filtering material of the inner element 24 being washable in that it comprises woven glass-fibre fabric.

WHAT I CLAIM IS:—

1. An air filter for use in a vacuum line connected to a welding mask, comprising a casing having an inlet and an outlet, and a pair of concentrically-arranged cylindrical air-filtering elements disposed within the casing and arranged in series, the inner filtering element through which the air passes first being formed of a pair of cylindrical air-permeable metal screens between which is sandwiched a woven glass-fibre fabric as a washable filtering medium, and the outer filtering element through which the air passes second having air-permeable paper as a filtering medium.

2. A filter according to claim 1, in which the filtering medium is at least one of the filtering elements is in pleated form.

3. A welding mask filter system comprising a vacuum source connected by a pipe or other conduit to the delivery side of a filter as claimed in claim 1 or claim 2, the air-entry side of the filter being connected by a flexible pipe to a welding mask.

4. A filter system according to claim 3, in which the air-exhaust side of the vacuum source leads into further air-filtering means from which the air is exhausted to atmosphere.

5. A filter system according to claim 4, in which the said further air-filtering means include activated carbon as a filtering medium for the removal of ozone from the air drawn into the vacuum source.

6. A filter system according to claim 5, in which the activated carbon is in the form of granules sealed in a multiplicity of cells by perforated plates or wire mesh screens.

7. A filter according to claim 1 substantially as described herein with reference to the accompanying drawing.

8. A filter system according to claim 3 substantially as described herein with reference to the accompanying drawing.

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1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

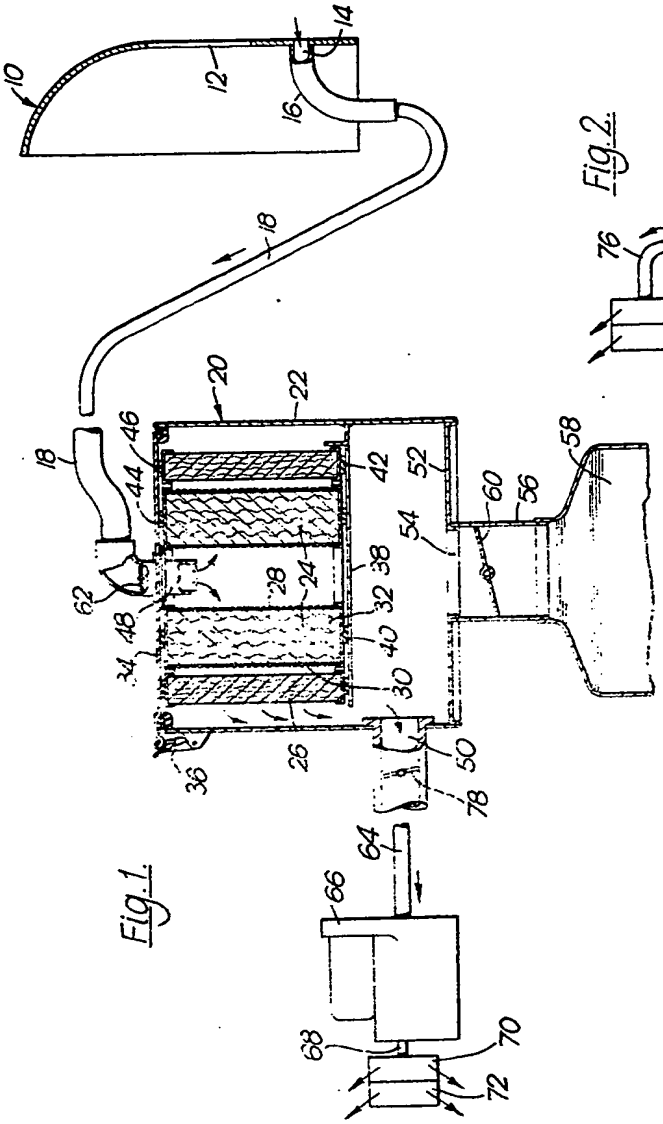

Fig.1.

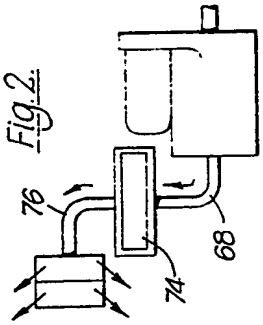

Fig.2.